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**Signature whistle development in the bottlenose dolphin (*Tursiops truncatus*)**

**This is a pre print version of the following article:**

*Original Citation:*

*Availability:*

This version is available <http://hdl.handle.net/2318/1586853> since 2016-07-25T19:20:01Z

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## APPRENDIMENTO VOCALE E ONTOGENESI DEL FISCHIO FIRMA NEI DELFINI *EX-SITU*

### *SIGNATURE WHISTLE DEVELOPMENT IN THE BOTTLENOSE DOLPHIN* (*TURSIOPS TRUNCATUS*)

**Abstract** - Adult bottlenose dolphins produce individually distinctive recognition calls called signature whistles. These are given when animals are isolated from conspecifics or when groups of animals meet at sea. Bottlenose dolphins are also capable of vocal learning and copy each other's signature whistles in an attempt to address others. Given their vocal learning skills and the wide variety of whistle contours used by this species, we investigated how signature whistles develop in bottlenose dolphin infants. We recorded five infants in three different facilities from their day of birth up to an age of 3 months to document whistle development. Previous studies had shown that signature whistles are crystallized after 3 months. To assure reliable caller identification, recordings were taken with suction cup hydrophones on or close to the head of each infant during routine veterinary examination outside the water. We found that early whistles often had noisy side bands and that whistle rates were high in initial recording sessions with up to 45 whistles per min, but decreased to as few as 12 whistles per min in later sessions. Peak frequency and duration of whistles increased with age, and the final signature whistle frequency modulation pattern emerged as early as 1 month after birth, but in one animal took more than 3 months to develop. Future studies need to focus on the role of vocal learning in signature whistle development.

**Key-words:** bioacoustics, cetaceans, vocal ontogeny.